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Toxicity assessment of polluted sediments using swimming behavior alteration test with Daphnia magna

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Published under licence by IOP Publishing Ltd. Recently behavioral responses of organisms are increasingly used as a reliable and sensitive tool in aquatic toxicology. Behavior-related endpoints allow efficiently studying the effects of sub-lethal exposure to contaminants. At present behavioural parameters frequently are determined with the use of digital analysis of video recording by computer vision technology. However, most studies evaluate the toxicity of aqueous solutions. Due to methodological difficulties associated with sample preparation not a lot of examples of the studies related to the assessment of toxicity of other environmental objects (wastes, sewage sludges, soils, sediments etc.) by computer vision technology. This paper presents the results of assessment of the swimming behavior alterations of Daphnia magna in elutriates from both uncontaminated natural and artificially chromium-contaminated bottom sediments. It was shown, that in elutriate from chromium contaminated bottom sediments (chromium concentration 115±5.7 μg l-1) the swimming speed of daphnids was decreases from 0.61 cm s-1 (median speed over the period) to 0.50 cm s-1 (median speed at the last minute of the experiment). The relocation of Daphnia from the culture medium to the extract from the non-polluted sediments does not essential changes the swimming activity.

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